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Effect of pollution on the fish diversity in Anchar Lake, Kashmir

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Abstract

The present study deals with the fish diversity undertaken during January 14 to December 2015 in Anchar Lake. The paper deals with the variety and abundance of fresh water fishes in the lake. The investigation revealed the occurrence of fifteen fish's species belonging to four orders. Order Cypriniformes were dominated by twelve species, saluriforms, Cyprinidontiformes and Salmoniformes with one species each. Schizothorax esocinus was the dominant fish species which contributed 35.2%. Fish species in the Anchar Lake decreased gradually because of the anthropogenic pressure.

Keywords: Fish, pollution, Anchar Lake

1. Introduction

Fishes are one of the important elements in the economy of many nations as they have been a stable item in the diet of many people. Fish biodiversity of lake essentially represents the fish faunal diversity and their relation trophic level and lake dimensions (Hayes FR (1957) ^[3]. Biodiversity is the essential for stabilization of ecosystem, protection of overall environmental quality for understanding intrinsic worth all species on the earth (Ehrich, 1991) ^[2]. Kashmir has been gifted by nature with a number of water bodies which are inhabited by a number of fish species both endemic and exotic.

Since 90 is the water bodies have been marred by extensive pollution, siltation and encroachments, gradually affecting the fish biodiversity? According to Qureshi (2007) ^[6] construction of hydroelectric power projects along the tributaries of the different water bodies also depleted the fin fish biodiversity of the state. As per current scenario of the said water body, the recently 2014 floods (natural disaster) have also depleted biotic species of the lake especially fish fauna, which indirectly affects on the whole food chain of the said lake. To understand such impacts caused by anthropogenic activities on the fin fishes of both inlet and outlet sources of the Anchar Lake. The present study was carried out the affect of pollution on the diversity of fish fauna in Kashmir valley.

2. Material and methods

Fishes were collected from Anchar lake at different six sites with the help of local fisher man using different types of nets namely cast nets and gill nets. Photographs were taken with the help of digital camera. Fishes were brought to laboratory and preserved in 10% formalin solution in separate specimen jars according to the size of species. Small fishes were directly placed in the 10% formalin solution. While large fishes were given an incision in their abdomen and preserved. The meristic and morphometric characters of the collected fishes were measured and identified up to the species level with the help of using standard method of (Talwar and Jhingran 1991) ^[10].

3. Results

During the present period different fish varieties have been observed in the Anchar lake and results showed that 15 species belonging to four orders Cypriniformes, saluriforms, Cyprinidontiformes and Salmoniformes were collected during course of the study period. The members of order cypriniformes were dominated by 12 species, saluriforms, Cyprinidontiformes and Salmoniformes with one species each.

The dominance pattern of the species at different sites by number showed trend as: site iv > site iii> site ii > site v > site vi > site I, were recorded with the maximum number of 11 species at site iii. Fish diversity at different selecting sites is primarily influenced by the water currents. The maximum number of species are present at site iv (Mean-152) and the minimum diversity at site I (Mean- 8.7). As per the species the dominance pattern of the ichthyofauna showed the trend as: Schizothorax ecocinus > S. plagiostomus > S.labiatus > S.

niger > S. curvifrons > Cypinus carpio communis > Carassius carassius > Cyprinus carpio specularis > Crossocheilus Aplocheilus > Bangana diplostoma > Puntius conchoniuis > Triplophysa kashmirensis > Gambusia affinis > Salmo trutta fario > S. richardsoni. Among the all species Schizothorax esocinus was the dominant fish species which contributed 35.2 %. Salmo trutta fario is an exotic species in the valley and is generally found at site i.

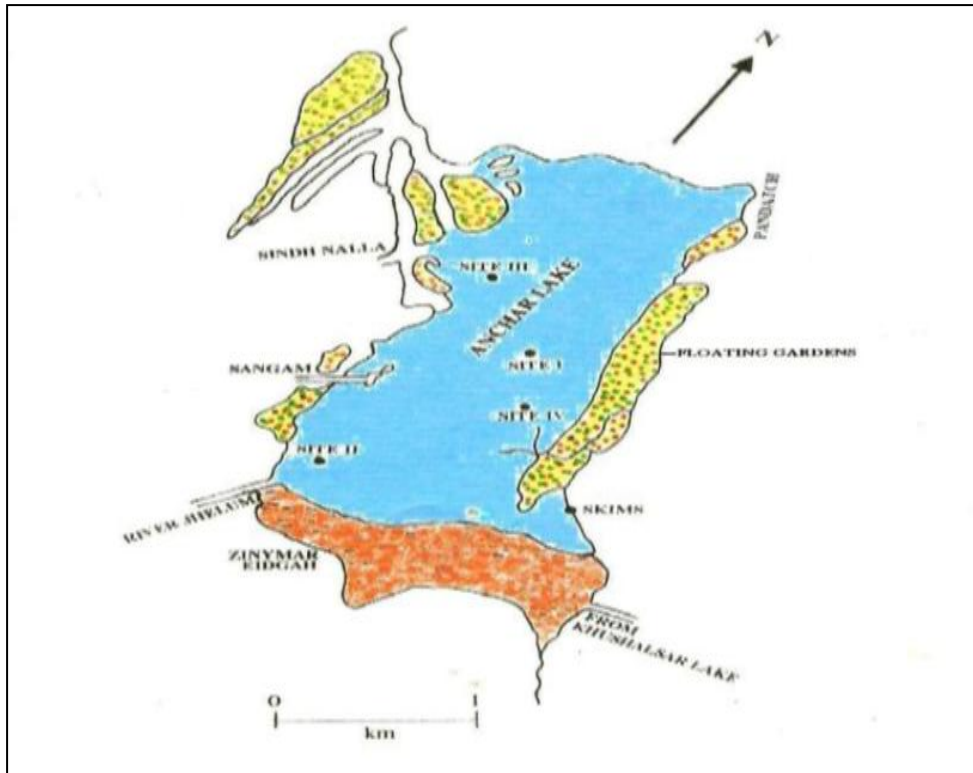


Fig 1: Site 1, Sangam site, 2 Sindh nalla, 3 Zindymar eidgah site, 4 Jinab shab shrine site, 5 Skims site, 6 Centre site.

Table 1: Percent contribution (by number) of different fish in Anchar lake Kashmir.

| S. No | Fish | Site I | Site II | Site III | Site IV | Site V | Site VI |
|-------|----------------------------|--------|---------|----------|---------|--------|---------|
| 1 | Salmo trutta fario | 30.4 | - | - | - | - | - |
| 2 | S. plagiostomus | 34.2 | 19.2 | 9.9 | 11.5 | 15.9 | 25.4 |
| 3 | Schizothorax ecocinus | 35.23 | 23.7 | 8.6 | 12.7 | 15.2 | 23.3 |
| 4 | S.labiatus | - | 11.8 | 8.5 | 13.5 | 15.4 | 23 |
| 5 | S. niger | - | 5.1 | 9.9 | 7.1 | 17.5 | 28.1 |
| 6 | S. richardsoni | - | 3.7 | - | - | - | - |
| 7 | S. curvifrons | - | - | 3.1 | 11.5 | - | - |
| 8 | Crossocheilus diaplochilus | - | 26.6 | - | - | - | - |
| 9 | Tritlophysa kashmirensis | - | 5.1 | - | - | - | - |
| 10 | Bangana diplostoma | - | 4.4 | 4.2 | - | - | - |
| 11 | Cypinus carpio communis | - | - | 7.4 | 17.2 | 15.9 | - |
| 12 | Cyprinus carpio specularis | - | - | 6.2 | 12.5 | 10.8 | - |
| 13 | Puntius conchoniuis | - | - | 4.9 | - | - | - |
| 14 | Gambusia affinis | - | - | 4 | - | - | - |
| 15 | Carassius carassius | - | - | 4.9 | 13.6 | 9.2 | - |

Table 2: Annual mean diversity of ichthyofauna at different selecting sites

| S. No | No of sites | Annual mean |
|-------|-------------|-------------|
| 1 | Site I | 8.75 |
| 2 | Site II | 56.25 |
| 3 | Site III | 67.16 |
| 4 | Site IV | 152.16 |
| 5 | Site V | 36.16 |
| 6 | Site VI | 24.25 |

4. Discussion

Kullander (1999) [4] reported more than 15 species of fishes from the lakes of valley. Siraj S. et al (2006) [8] reported 19 species of fishes in river Jhelum and its tributaries. During the present study period 15 species belonging to four orders (table 1) were collected during course of the study period. It has been observed that the fish species were declined gradually because of overexploitation, habitat destruction. Another reason of fish decline is due to 2014 flood causes siltation of

breeding grounds. The chemical discharge from different labs of Sheri Kashmir institute of medical sciences is somehow filtered by different processes by the concerned department, but sometimes a little discharge along with municipal wastes makes the water body toxic for fish consumption. Maximum number of species were collected from site iv where the water level is more than other sites. Minimum species are collected at site I, where the water level is low because of macrophytic vegetation. Hora (1940) ^[11] and Nautiyal (2002) ^[12] has also discussed various threats to the survival of mahaseer, as a major cold water fish due to the stress caused on the ecology and destruction of its feeding and spawning grounds as an impact of certain anthropogenic activities. Thus these impact lead to the depletion in fish diversity of these respective areas. A number of scientists have opined one of aspects of environmental degradation is the altered ecology and destruction of both feeding and breeding habitat due to multipurpose projects Nautiyal and Singh (1989) and Qureshi (2007) ^[6]. Several limnologists have reported that the excessive and unchecked use of pollution-causing herbicides, pesticides and fertilizers of sub- standard quality is the mean threat to the survival of these fish species.

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